METHOD AND APPARATUS FOR ENCODING/DECODING IMAGES USING A MOTION VECTOR OF A PREVIOUS BLOCK AS A MOTION VECTOR FOR THE CURRENT BLOCK

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This application is a continuation application of U.S. patent application Ser. No. 15/133,918, filed on Apr. 20, 2016, which is a continuation application of U.S. patent application Ser. No. 13/574,110, filed on Jul. 19, 2012, which is a National Stage application under 35 U.S.C. §371 of PCT/KR2011/000387 filed on Jan. 19, 2011, which claims priority from U.S. Provisional Patent Application No. 61/296,141, filed on Jan. 19, 2010 in the U.S. Patent and Trademark Office, and Korean Patent Application No. 10-2011-0005377, filed on Jan. 19, 2011 in the Korean Intellectual Property Office, all the disclosures of which are incorporated herein in their entireties by reference.

BACKGROUND

[0002] 1. Field

[0003] Apparatuses and methods consistent with exemplary embodiments relate to encoding and decoding an image, and more particularly, to encoding and decoding an image based on inter prediction.

[0004] 2. Description of the Related Art

[0005] According to video compression standards, such as MPEG-1, MPEG-2, and MPEG-4 H.264/MPEG-4 AVC (Advanced Video coding), an image is encoded by dividing the image into predetermined sized blocks. Next, each of the predetermined sized blocks is prediction-encoded by using inter prediction or intra prediction.

[0006] For inter prediction, motion estimation is performed by searching at least one reference frame for a block that is the same as or similar to a current block, a motion vector produced by performing the motion estimation is encoded together with pixel values, and a result of encoding is then inserted into a bitstream.

SUMMARY

[0007] Aspects of one or more exemplary embodiments provide an image encoding method and apparatus and an image decoding method and apparatus, in which a motion vector of a current block is determined based on a motion vector of at least one previous block and an image is encoded/decoded based on the determined motion vector, and a computer readable recording medium having recorded thereon a program for executing the image encoding method and/or the image decoding method.

[0008] According to aspects of an exemplary embodiment, encoding is performed using a motion vector of at least one previous block as a motion vector of a current block, thereby increasing a hit ratio of an encoding mode and the precision of prediction. Accordingly, it is possible to encode and decode an image with a higher compression ratio.

[0009] According to an aspect of an exemplary embodiment, there is provided an image decoding method of determining a motion vector of a current block based on a motion vector of at least one block decoded before decoding of the current block, and decoding the current block based on the determined motion vector, the method including: decoding information regarding a prediction direction to be used to decode the current block from among a first direction, a second direction, and bi-directions, and information regarding pixel values of the current block; determining a prediction direction in which the current block is to be predicted, based on a result of decoding the information regarding the prediction direction, and determining at least one motion vector for predicting the current block in the determined prediction direction; and restoring the current block, based on the at least one motion vector and a result of decoding the information regarding the pixel values, wherein the first direction is a direction from a current picture to a previous picture, and the second direction is a direction from the current picture to a subsequent picture.

[0010] According to an aspect of another exemplary embodiment, there is provided an image encoding method of determining a motion vector of a current block based on a motion vector of at least one block encoded before encoding of the current block, and encoding the current block based on the determined motion vector, the method including: determining a first-direction motion vector and a second-direction motion vector of the current block based on the motion vector of the at least one block; determining a prediction method to be used to encode the current block from among first-direction prediction, second-direction prediction, and bi-directional prediction, based on the first-direction motion vector and the second-direction motion vector; and encoding information regarding a prediction direction used in the determined prediction method, and information regarding pixel values of the current block produced based on the prediction method, wherein the first direction is a direction from a current picture to a previous picture, and the second direction is a direction from the current picture to a subsequent picture.

[0011] According to an aspect of another exemplary embodiment, there is provided an image decoding apparatus for determining a motion vector of a current block based on a motion vector of at least one block decoded before decoding of the current block, and decoding the current block based on the determined motion vector, the apparatus including: a decoder for decoding information regarding a prediction direction to be used to decode the current block from among a first direction, a second direction, and bi-directions, and information regarding pixel values of the current block; a motion vector determiner for determining a prediction direction in which the current block is to be predicted, based on a result of decoding the information regarding the prediction direction, and determining at least one motion vector for predicting the current block in the determined prediction direction; and a restoring unit for restoring the current block, based on the at least one motion vector and a result of decoding the information regarding the pixel values, wherein the first direction is a direction from a current picture to a previous picture, and the second direction is a direction from the current picture to a subsequent picture.

[0012] According to an aspect of another exemplary embodiment, there is provided an image encoding apparatus for determining a motion vector of a current block based on a motion vector of at least one block encoded before encoding of the current block, and encoding the current block based on the determined motion vector, the apparatus including: a motion vector determiner for determining a first-direction motion vector and a second-direction motion